

***Chicorium intybus***

**Chicory**

**Compositaea**

This species is the only member of the genus *Chicorium* found in California. It has become naturalized throughout much of cismontane California in waste places; the genus is native to Europe. *C. intybus* has erect stems from a deep perennial taproot, and is glabrous to hairy, 3-10 dm tall. The lower leaves are oblanceolate, toothed, or pinnatifid, and are 1-2 dm long, reduced. Upper leaves are much reduced and sessile. There are 1-3 heads in the axils of the much reduced upper leaves, and the branches are nearly naked and racemiform. Flower heads are about 4 cm broad in antithesis, blue, or occasionally white. The involucre is 10-15 mm in length, and the outer phyllaries are loose, fewer and about half as long as the inner callous thickened at the base. Akenes are 2-3 mm long, with minute pappus scales (Stebbins 1996). Chicory is a summer active plant that is dormant in winter, but responds quickly to warm temperatures in the spring (Li et al. 1997).

Chicory was first introduced to the United States from the Netherlands in ca. 1785. The ground, dried roots of this plant were to be used as a coffee substitute or adulterant. Chicory was cultivated for this purpose by the Moravians of Bethlehem, PA, in the late 1700s (Jung et al. 1996). *C. intybus* was first listed on the Pennsylvania Noxious Weed List in 1939 (Hill 1983), but because of its value as forage for sheep and cows, the Pennsylvania Department of Agriculture amended the State regulation of chicory in 1993 to allow Pennsylvania farmers to grow it. Much of the information available pertaining to the ecology of *C. intybus* is the result of efforts to increase the yield of this forage plant.

Agronomists concerned with maximizing chicory herbage yields have carried out a number of experiments on the grazing management of chicory in which the key objective is to maximize leaf growth and minimize stem (and subsequent seed head) development (Hare et al. 1987, Clark et al. 1990, Kromolong et al. 1992, Moloney and Milne 1993, Li et al. 1987). Because suppressing reproductive output is a key component of weed control, these experiments may provide insight into management of *C. intybus* as an introduced weed. The most recent experimental results pertaining to the management of this species are summarized below.

Li et al. (1997) investigated the effects of different grazing frequencies and intensities on herbage production and on persistence of chicory in New Zealand. The greatest yield of herbage was obtained at lowest grazing frequencies, while the lowest stem mass was observed in treatments with higher frequencies of grazing. Grazing intensity was found to have little effect. Li et al. also found that grazing in late autumn resulted in approximately 27% fewer plants the following spring.

Jung et al. (1996) conducted an investigation of management levels on herbage production and quality, suppression of floral stem production, and stand persistence.

Management regimes were defined on the basis of the number of harvests and the amount of N added. Management did not affect the total yield of chicory during the first year, but the "lenient" treatment (harvested less often and receiving less N) had a higher yield the second year. Rapid stand establishment gave the chicory a competitive advantage over orchardgrass, also included in the study (Jung et al. 1996).

Lancashire and Brock (1983) reported that in mixed grass pastures under set-stocking all year, chicory rapidly disappeared, while under rotational grazing chicory persistence was excellent. Niezen et al. 1993. emphasized the need for proper grazing management to prevent plants bolting to seedhead. In a study of the impact of grazing on chicory yields, Volesky (1996) found that moderate and slow rotational grazing resulted in significantly greater yields than with fast rotations. Fewer chicory plants bolted at the higher grazing intensity. Though not stated by the authors above, it would appear that heavy grazing or frequent clipping/mowing would be helpful in controlling weedy populations of chicory.

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